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What is claimed is:

1. A process for preparing a cycloorganylphosphane of formula I (R^1P)_n by reaction of a dihalo(organyl)phosphane of formula R^1PHal_2 ,

wherein

R^1 is C₁-C₁₂alkyl; C₃-C₁₂cycloalkyl, aryl or heteroaryl,

Hal is F, Cl, Br or I, and

n is a number from 3 to 20,

with

a) activated zinc in an organic solvent, or with

b) an alkali metal or alkaline earth metal in a non-polar organic solvent in the presence of an activator selected from the group consisting of ethers and polyethers, amines and polyamines, aromatic N-heterocycles and carbonic acid derivatives, wherein the ratio by volume of non-polar solvent to activator is from 10 : 0.1 to 10 : 5.

2. A process for preparing a cycloorganylphosphane of formula I (R^1P)_n according to claim 1 by reaction of a dihalo(organyl)phosphane of formula R^1PHal_2 with activated zinc in an ethereal solvent.

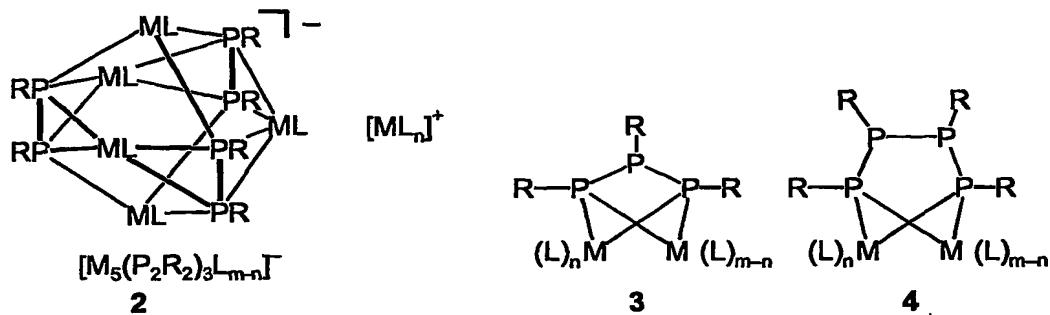
3. A process for preparing a cycloorganylphosphane of formula I (R^1P)_n according to claim 1 by reaction of a dihalo(organyl)phosphane of formula R^1PHal_2 with an alkali metal or alkaline earth metal in a non-polar organic solvent in the presence of an activator selected from the group consisting of ethers and polyethers, amines and polyamines, aromatic N-heterocycles and carbonic acid derivatives, wherein the ratio by volume of non-polar solvent to activator is from 10 : 0.1 to 10 : 5.

4. A process according to claim 3 wherein the non-polar organic solvent is toluene and the activator is tetramethylethylenediamine or dimethoxymethane.

5. A process according to any one of claims 1 to 3 wherein R^1 is phenyl.

6. A di(alkali metal/alkaline earth metal) oligophosphanediiide of the structural formula 2, 3 or 4

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wherein

R is C₁-C₆alkyl; C₃-C₆cycloalkyl, aryl or heteroaryl;

M is Li, Na, K, Cs or Mg;

Hal is F, Cl, Br or I;

L is an activator; and

n and m denote the number of coordinated molecules L, which may be from 1 to 8.

7. A di(alkali metal/alkaline earth metal) oligophosphane diide according to claim 6 wherein R is phenyl and L is tetramethylethylenediamine or 1,2-dimethoxyethane.

8. The preparation of a di(alkali metal/alkaline earth metal) oligophosphane diide of formula (2), (3) or (4) according to claim 6 by reaction of a dihalo(organyl)phosphane of formula RPHal₂, wherein

R is C₁-C₁₂alkyl; C₃-C₁₂cycloalkyl, aryl or heteroaryl,

Hal is F, Cl, Br or I, and

n is a number from 3 to 20,

with an alkali metal or alkaline earth metal in a non-polar organic solvent in the presence of an activator, wherein the molar ratio of alkali metal or alkaline earth metal to RPHal₂ is > 1.

9. The use of a di(alkali metal/alkaline earth metal) oligophosphane diide of formula (2), (3) or (4) according to claim 6 in the preparation of an organophosphorus compound.